

**HAND COVERING WITH EXPANSE OF FORMED MATERIAL  
HAVING PLURAL WIPERS**

Cross Reference to Related Applications

5        This is a continuation of application Serial No. 09/675,557, filed September  
29, 2000, which was a continuation-in-part of application Serial No. 29/114,784 filed  
December 1, 1999 for a RUBBERIZED AND RIBBED WIPING AREA FOR A GLOVE  
OR MITTEN. This application also claims priority to provisional application Serial No.  
60/213,724 filed June 22, 2000 for FORMED MATERIAL FOR CLEANING,  
10 CUSHIONING AND ABRASION RESISTANCE. The subject matter of all of the  
above-identified applications is incorporated herein by reference.

Technical Field

The present invention relates generally to ribbed formed materials for  
cleaning, cushioning and abrasion resistance, and more particularly to a hand covering with  
15 such ribbed formed materials. As used and described further below, cleaning is meant to  
include wiping surfaces to remove unwanted matter.

Background Art

For skiers, snowboarders, cyclists, there is a problem in dealing effectively  
with removal of water, sleet or snow from associated eyewear or eye-protection devices.  
20 Use of the term cycle is meant to include bicyclists and motorcycle drivers and riders.  
For example, a skier or snowboarder will regularly need to remove water/sleet/snow from  
their goggles while they are skiing/snowboarding. That removal is not as easy as it may  
sound because the gloves/mittens regularly worn by skiers/snowboarders limits fine

motor activity so that it is difficult to handle tools for wiping goggles. A similar situation exists for cyclists as they often wear gloves while riding. For cyclists, the eyewear may be glasses/sunglasses or plastic windshields associated with helmets.

In each situation the problem is exacerbated because the person will often

5 want/need to remove the water, sleet or snow while performing the corresponding activity. The nature of each of these activities makes it difficult to quickly and effectively make such removal because the person must concentrate closely on what they are doing and cannot afford to focus their attention on finding and properly positioning conventional wipers/cleaners such as a piece of cloth or miniature squeegees. In the case

10 of conventional squeegees, further attention is required by the user because these devices require orienting the associated blade in a specific way to achieve desired wiping. Again, such a requirement is impractical when skiing/snowboarding down a slope or riding/driving a cycle.

Conventional proposals dealing with this situation involve various versions

15 of a manual squeegee such as those shown in U.S. Patents Nos. 4,893,373 to Kato, 4,827,557 to Siler, Jr. et al., 4,787,113 to Kamenske, 4,757,556 to Girard, and Des. 347,716 to Pomerleau. In general, these proposals involve finger-worn devices designed for strapping on to a finger, and in one case involve a single rigidly-oriented blade attached to a glove and projecting outwardly from the glove at what appears to be about a

20 60 angle. None of these proposals are suitable for the above-described application because people who wear gloves/mittens do not have the fine motor movement

necessary to put on a finger-worn device, mittens do not even have fingers, and the squeegee blades require that the device be oriented in a specific way before using it.

Accordingly, it would be useful to provide equipment that allows skiers, snowboarders and cyclists to remove water/sleet/snow or other unwanted fluid material from their goggles/protective eyewear. A general object of the present invention is to provide such equipment. More specifically, objects of the invention include to provide such equipment that can be: (1) used effectively and easily while wearing gloves/mittens; (2) incorporated integrally into gloves/mittens; (3) used without need to orient associated wipers in a certain way; (4) incorporated to add a desired look to gloves/mittens; (5) used while performing activities that require almost total focus on the particular activity; and (6) incorporated into gloves/mittens in a cost-effective way.

#### Summary of the Invention

One way to characterize the invention is as a hand covering with an expanse of formed material for cleaning. The hand covering includes a body for covering the hand of a wearer. Also included is an expanse of formed material joined to the body and including plural wipers. The expanse may include a region that covers one or both the forefinger and thumb. The wipers are formed as plural, laterally-spaced ribs extending upwardly from the body, and the wipers may extend linearly or arcuately with respect to the long axis of the body. For wipers extending arcuately, there could be multiple curves or bends (as shown in Fig. 3) or a single curve or bend (undepicted). Each rib includes a base and a blade, and the blade is constructed to flex bi-directionally.

Various features and other objects and advantages which are attained by the invention will become more fully apparent after consideration of the accompanying drawings and the detailed description of the preferred embodiment which follows.

Brief Description of the Drawings

5 Fig. 1 is an isometric view of a hand covering constructed in accordance with an embodiment of the present invention.

Fig. 2 is a fragmentary view illustrating the region of the hand covering encircled by circle-2 in Fig. 1.

10 Fig. 3 is like Fig. 2 except that it illustrates an alternate embodiment of the region shown in Figs. 1-2.

Fig. 4 is an enlarged isometric view of sections of the rib component of the invention, made in accordance with the preferred embodiment of the invention.

Fig. 5 is an enlarged isometric view of sections of the rib component of the invention, made in accordance another embodiment of the invention.

15 Fig. 6 is an enlarged isometric view of sections of the rib component of the invention, made in accordance with another embodiment of the invention.

Fig. 7 is an isometric view of a hand covering constructed in accordance with a preferred embodiment of the present invention.

20 Figs. 8-10 show fragmentary, enlarged, successive sectional views of the forefinger of the glove shown in Fig. 1 illustrating movement of the glove downwardly to use the ribbed formed material of the invention to clean or wipe a wet surface such as a ski goggle.

Fig. 11 is like Figs. 8-10 except that it illustrates, on a scale slightly enlarged from that shown in Figs. 8-10, movement of the glove downwardly to use the ribbed formed material of the invention to clean or wipe a wet surface such as a ski goggle.

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Detailed Description of Preferred Embodiment

and Best Mode of Carrying Out the Invention

Referring to Fig. 1, the invention is shown at 10 as a hand covering 12 such as a glove which covers the fingers 14 and thumb 16 of a wearer, a portion of whose arm is shown at 18. Hand covering 12 includes a body 20 for covering the hand of the wearer, and an expanse 22 of formed material joined to the body, preferably integrally, and including plural wipers 24 extending upwardly from a mat 25. As shown in Fig. 1, expanse 22 forms a region 26 of body 20 that covers portions of forefinger 14a and thumb 16. Preferably, for reasons which will be described, expanse 22 forms a region which of the body which covers only portions of the thumb (see expanse 422 in Fig. 7).

10 Referring back to Fig. 1, expanse 22 may also be positioned in a region covering a top portion of forefinger 14a, such as that portion identified at 27 by a dot-dash-dash line.

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Referring to both Figs. 1 and 2, wipers 24 are preferably formed as plural, laterally-spaced ribs extending upwardly from body 20. Wipers 24 may also be thought of as ridges. Body 20 has a long axis A and ribs 24 preferably extend generally linearly along long axis A. As depicted in Fig. 1, long axis A is meant to represent the long axis of the fingers and thumb, with the thumb positioned so that it extends generally in parallel with long axis A.

While not depicted in Fig. 1, it is also possible that ribs 24 could be positioned to extend linearly along a long axis B represented solely by thumb 16. Alternatively, referring for a moment to Fig. 3, there is shown an alternate embodiment of the invention with expanse 122 including ribs 124 and mat 125, with ribs 124 that 5 extend arcuately along long axis A. In addition to the variations shown between the ribs in Figs. 2 and 3, many other variations are possible so that expanse 22 and ribs 24 can be formed in various designs to achieve the wiping feature described below, and also to achieve a certain desired look.

Referring to Fig. 4, further details of the preferred version of expanse 22 are 10 shown with ribs 24 including a blade 24a and a base 24b. Each blade is constructed to flex bi-directionally as will be described. Preferably, each blade is constructed to be about as long as the distance between a given blade and a next blade, i.e. to be about as long as the distance between blades. To perform wiping as described herein, the overall size of the ribs may be in the following range: a relatively large rib being greater than  $\frac{1}{4}$ " 15 (where the corresponding blade is about .10 -.15"), a medium sized rib being about  $\frac{1}{4}$ ', and a relatively small rib being less than  $\frac{1}{4}$ ".

Still referring to Fig. 4, the blades are positioned on a mat 25, preferably made up of a planar base region 25a and a reinforcing region 25b. It has been found that having reinforcing region 25b ensures optimal wiping function shown and described later 20 in connection with Figs. 8-11. It is also possible to omit reinforcing region 25b and achieve the wiping function shown in Figs. 8-11. However, best wiping results were obtained by having a reinforcing region like that shown as region 25b.

Still referring to Fig. 4, mat 25 is shown as having regions 25a, 25b formed as separate sections, or layers of material. It is also possible that regions 25a, 25b could be formed as a uniform piece of material. It should also be understood that the various components of expanse 22 may be formed in any suitable way, including conventional plastic forming techniques such as that described below.

Referring to Figs. 5-6, alternate embodiments of the ribs are shown with ribs 224 including blades 224a and bases 224b, and ribs 324 including blades 324a and bases 324b. To focus attention only on rib construction, the mat section (like mat 25 in Fig. 4) is not depicted. In Fig. 6, there is no delineation between the blade and base sections of the rib illustrating that the rib may have a 1-part or a 2-part construction.

Referring again to Fig. 7, the preferred version of the invention is shown at 410 as a hand covering 412 such as a mitten which covers fingers 414 and thumb 416 of a wearer, a portion of whose arm is shown at 418. Hand covering 412 includes a body 420 for covering the hand of the wearer, and an expanse 422 of formed material joined to the body, preferably integrally, and including plural wipers 424. In this embodiment, expanse 422 forms a region 426 of body 420 that covers only forefinger 14a.

For a combination of reasons related to ergonomic considerations and difficulties incorporating expanse 22 into a desired section of a hand covering such as glove 20, the following are the preferred order of locations for expanse 22 in glove 20:

1. along thumb such as expanse 422 in Fig. 7; 2. along top of forefinger 14a as shown by dash-dot-dot line 27 in Fig. 1; or 3. along left side of forefinger 14a as shown in Fig. 1. Essentially, incorporation of the expanse in a section of the thumb of the glove is easiest

because the thumb is relatively wide. The thumb section of the glove is also in a desirable location ergonomically, allowing the glove wearer to use the wiping function of the expanse easily by moving the thumb of the surface to be wiped.

The next easiest section of the glove in which to incorporate the expanse is 5 the top of forefinger 14a. The left side of forefinger 14a is most difficult to incorporate the expanse because placement in that location requires a new seam along the left side of the forefinger near the top region identified at 27 in Fig. 1. Further, bending of the forefinger within the glove causes the left side of the forefinger to crease in several sections corresponding to the knuckles of a wearer's forefinger. It is difficult to 10 incorporate the expanse, which adds thickness and a certain amount of rigidity to the forefinger section of the glove, along the left side of the forefinger without tending to make it difficult for the wearer to bend the forefinger (due to the added rigidity).

With respect to fastening the expanse to the glove, any suitable method of fastening pieces of fabric to plastic materials may be used. It is presently contemplated 15 that the expanse may be fastened over the top of a desired section of a glove or other hand covering using a suitable fastener method such as sewing with thread effective to bind a plastic expanse to the cloth or other glove fabric. Another possibility is to create a window in a desired expanse-attachment region (such as the thumb- or top-of-forefinger regions discussed above) by cutting out a section of a glove somewhat smaller than the 20 expanse to be attached. Then, the expanse is positioned over the opening from inside the glove and is sewn to the glove along areas of the glove bordering the opening. It is presently contemplated that the best way to incorporate the expanse may be to form the

opening in the glove, reinforce the area of the glove that defines the opening, and then sew the expanse to the glove after positioning it in the opening as described above.

Referring to Figs. 8-10, enlarged views of invention 10 are shown as the wearer moves the glove, including forefinger 14a, along a first path, such as downwardly 5 in the direction of the arrow, so that blades 24a contact a surface 28. Surface 28 may be the lens of a ski goggle, eyewear, an eye/wind shield associated with a cyclists helmet, or any other surface the wearer of glove 12 may need to wipe dry. Surface 28 is wet from snow, sleet, rain, dirt, or condensation (from fogging of goggles/eyewear) as illustrated by water droplets 30. As shown best in Figs. 9-10, blades 24a flex or bend in a first 10 direction that is generally upward so that the wearer may wipe surface 28 dry and make it easier to view through the surface in the view direction shown by line V. Wiping action may even been done at an angle rather than straight up or down due to the flexible quality of blades 24a.

Referring to Fig. 11, the wearer may also move the glove, including 15 forefinger 14a, along a second path, such as upwardly in the direction of the arrow. In this case, blades 24a flex or bend in a second direction that is generally downward, but the result is the same as that in Fig. 10, so that the wearer may wipe surface 28 dry and make it easier to view through the surface in the view direction shown by line V.

Referring to the formed material itself, the material may also be thought of as 20 including a base sub-region (like base 24b) and a rib sub-region (like blade 24a). For purposes of achieving the wiping function of the invention, the base sub-region does the following two things: 1. it raises the corresponding blade to locate a flex point above the

surface of the glove so the flex point is away from glove, and 2. it ensures that each blade will not interfere with another blade during wiping. The rib sub-region may also be thought of as a ridge sub-region. As shown in the above-referenced figures, there are certain contemplated shapes of each rib component within the rib sub-region to achieve the above-  
5 identified functions of the invention. It is also possible that other shapes will be usable in the material of the invention to perform the desired functions. As depicted in the figures, the rib sub-region includes plural rib components positioned in a repeating fashion. However, it is also possible that the rib components could be positioned in a non-repeating patterns, or in multiple subcombinations of repeating patterns and non-repeating patterns.  
10 There could also be repeating or non-repeating blade heights. The figures also show that the rib components may be positioned in a variety of configurations relative to each other, such as laterally and linearly, or laterally and arcuately. The arcuate relative positioning of rib components may also be thought of as being positioned as a wave. The rib components may also be spaced and positioned in circular patterns.

15 As shown in Figs. 4-6 and 8-11, the ribs includes a relatively flexible top end (or blade) that makes the ribs particularly effective for wiping goggles/eyewear when the material of the invention is used for the glove application. That flexible nature of the top of the ribs is achieved by (1) the nature of the substance from which the material is formed, and (2) a mechanical feature of the invention based upon the shape of the top region. The  
20 latter mechanical feature allows the top region to bend under pressure as shown in Figs. 8-11. In contrast, conventional squeegee-type blades (such as windshield wiper blades) are rigid, relatively non-bending devices that also require a specific orientation of the blade to a

surface to wipe effectively. Using the present invention, there is no requirement to orient the ribs in a certain way relative to the surface to be wiped because of the above-described flexible nature of the top regions of the rib components.

It has also been found that the formed material of the invention could be  
5 formed to achieve the above-noted functions and at the same time be formed to look like a preselected shape(s) to achieve a certain look. For example, the formed material of the invention could be formed to look like a logo to be attached to clothing such as gloves, and at the same time have a pre-selected pattern(s) of rib components to achieve the desired cleaning (such as wiping), cushioning or abrasion resistance. In this way, the formed  
10 material of the invention could be thought of as a functional logo.

The following process, including material selection, was found effective to form a prototype. For commercial applications suitable modifications would be necessary. First, to form a master pattern, a base pattern was formed from individual rubber strips mounted by epoxy to a slab of acrylic plastic. Next, a frame was placed around the base  
15 pattern using 1" acrylic bar stock. Next, to make a mold, 74-30 Silicone compound was mixed at 1:1 ratio to form a "blue" silicone mold. After a cure time of approximately 24 hours, the mold was heated at 125° F for 8 hours to establish complete cure, bake out of impurities and degassing. To form a prototype version of the invention, a 74 series polyurethane RTV liquid rubber compound was used and mixed at a 2:1 ratio prior to  
20 pouring into the mold. The prototype was then cured for approximately 12 hours (the silicone mold and 74 series rubber do not stick together). The prototype released easily from the mold, and was then cut into desired patterns for placement in a ski glove.

It is presently proposed to use either polyvinyl chloride (PVC) or certain commercially available silicone-based alternatives to PVC. In addition, it is possible that a variety of synthetic rubber and elastomeric compounds and even natural rubber will work as the formed material of the invention. In addition, it is proposed that the formed 5 material could be modified for specific applications by choosing a substance with particular desired qualities such as hardness, rigidity or abrasion resistance. It is also contemplated that a pre-selected color pattern will provide a visual pattern for what may be thought of as a hit zone, i.e. the section of the glove that includes the expanse, as in the are the glove wearer wants to use to "hit" a desired surface to wipe it. The idea is that a 10 glove wearer will find it easier to wipe using the glove of the invention if there is a distinctive color pattern associated with the expanse.

While the present invention has been shown and described with reference to the foregoing operational principles and preferred embodiment, it will be apparent to those skilled in the art that other changes in form and detail may be made therein without 15 departing from the spirit and scope of the invention as defined in the appended claims.